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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,541	01/28/2002	Reinhard Holste	2611 US	3724

7590 12/08/2003

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EXAMINER

LISH, PETER J

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 12/08/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/058,541

Applicant(s)

HOLSTE ET AL.

Examiner

Peter J Lish

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Applicant's arguments with respect to claims 1-12 have been considered but are moot in view of the new ground(s) of rejection. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 13 recites "said flue gas containing SO₂". It is indefinite as to whether the flue gas or the gas containing SO₂ is meant.

Claim Rejections - 35 USC § 103

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watson et al. (US 3,653,833) taken with Miller et al. (US 4,044,098).

Watson teaches a method for the conversion of sulfur dioxide into a mixture of hydrogen sulfide and elemental sulfur. The process comprises heating the gas mixture of sulfur dioxide and a reducing gas to a reaction temperature of about 1,000 to 2,400 °F, reacting the heated mixture in the presence of a catalyst, and recovering heat from the product gas stream, thereby lowering the temperature of the stream to about 700 to 800 °F. The sulfur dioxide gas may be essentially pure or it may comprise only a small percent of a gas mixture, such as in an industrial

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waste gas. The reducing gas may contain at least one of carbon monoxide, hydrogen, or any gaseous hydrocarbons, such as methane, ethane, or natural gas. Watson does not teach possible uses for the product gas comprising hydrogen sulfide and elemental sulfur.

Miller et al. teach the removal of mercury from a natural gas stream by reacting the stream with an amount of hydrogen sulfide sufficient to cause the precipitation of mercury as mercury sulfides. The sulfides of mercury are then scrubbed from the natural gas stream and further removed by a filter.

It would have been obvious to one of ordinary skill at the time of invention to use the hydrogen sulfide containing gas of Watson et al. as the hydrogen sulfide source of Miller et al. because it is obvious to use the product of one process as a reactant in another process if they are similar materials and the "other process" requires the product of the first process, as held by *In re Kamlet*, 88 USPQ 106.

Regarding the reaction of the elemental sulfur with the mercury to form mercury sulfide, it is inherent that this reaction occurs, as is known in the art.

Regarding claim 8, Watson teaches the cooling of the hydrogen sulfide containing gas to a temperature of about 700-800 °F. It is expected that this temperature is suitable for the reaction with the mercury containing natural gas because it is a significantly high temperature to achieve gaseous reactions. Alternatively, it would have been obvious to one of ordinary skill at the time of invention to cool the hydrogen sulfide containing gas of Watson to a temperature that is suitable for its reaction with the mercury containing natural gas.

Regarding claims 9-10, Watson does not explicitly teach the use of gas/gas heat exchangers for the heating and cooling of the gas streams. It would have been obvious to one of

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ordinary skill at the time of invention to use a heat exchanger of this type, however, as they represent known methods of heating and cooling gaseous streams which are effective to achieve the temperatures desired by Watson et al.

Regarding claim 11, Miller et al. does not explicitly teach uses of the natural gas prior to the mercury removal. It would have been obvious to one of ordinary skill at the time of invention, however, to use any heat energy of the natural gas in an efficient manner, such as for the heating of another process stream, i.e. air.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Lish whose telephone number is 703-308-1772 until December 11th and 571-272-1354 thereafter. The examiner can normally be reached on 9:00-6:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached at 703-308-3837 until December 11th and 571-272-1358 thereafter. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



PL

STUART L. HENDRICKSON
PRIMARY EXAMINER